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ABSTRACT

This module reviews the essential steps in basic mathematics as they are used in food service education. Special needs students using the module should be able to complete five applications of basic mathematics in food service with 90 percent accuracy. Designed for individualized instruction, the module consists of a teacher guide, a student guide, a student evaluation, a 35mm slide presentation and an audiocassette. The instructor guide contains an introduction, performance objectives, a script for a slide presentation, an answer key for the student evaluation, and answer keys for student worksheets. The student guide contains an introduction, performance objectives, procedures for using the module, information sheets, and a set of worksheets that further illustrate the computation steps involved in basic arithmetic and provide practice examples and exercises to directly involve the student in the review process. Topics covered include the following: stockroom mathematics, cost per item, weights and measures, temperature, time, metric conversions, and recipe modifications. (KC)

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INSTRUCTOR'S GUIDE

PROGRAM: FOOD SERVICE **UNIT TITLE:** BASIC MATHEMATICS

MODULE TITLE: Application of Basic Math to Food Service I **MODULE NO.** SN-83-390

INTRODUCTION:

A presentation for students reviewing the essential steps in basic mathematics as they are used in Food Service.

PERFORMANCE OBJECTIVES:

After completing this module, the student should be able to complete five basic applications of basic mathematics in Food Service with 90 percent accuracy.

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Learning Groups Designed For:

_____ Adult
_X_ Special Needs
_____ Secondary
_____ Post Secondary

Written By:

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TEACHING/LEARNING RESOURCES:

X Student Packet	____ Videocassette
X Instructor's Guide, Key, and Script	____ Film Loop
X 35 mm Slide Presentation	X Audiocassette
____ Filmstrip	

INSTRUCTIONAL METHODS SUGGESTED:

This module has been designed to illustrate to students the need for basic math skills in order to be successful in a food service career.

The Basic Math series, also available from The Media Center, may be used in conjunction with this module to review basic math functions on an individualized basis.

Students should be instructed to complete the worksheets in the Student Guide as they progress through the slide/tape presentation. Students are instructed to stop the tape and complete math calculations at frames 22, 25, 39, 46, 54, 59, 61, 63, and 66.

As students complete the worksheets in the Student Guide, they should be checked by the instructor and immediate feedback should be given.

KEY

WORKSHEET 1-A

STOCK ROOM MATH

EXAMPLE

Figure the number of cases on hand after counting the number of can in the stock room.

On January 9, there were 18 cans of ketchup on hand; each case contains 6 cans.

18 ÷ 6 = 3 cases

If each case cost the company $17.95, how many dollars worth of ketchup does the inventory represent?

$17.95 per case
x 3 cases
$53.85 worth of kethup in the stock room

DIRECTIONS: Refer to the "Inventory Sheet" which is included in this module to complete the calculations. Inventory for April 17.

1. The stock room has 204 cans of Good Time orange juice.

   How many cases are there? 17 CASES

   How many dollars of inventory does this represent? $237.15

2. The stock room has 36 cans of Del Monte Green Beans.

   How many cases are there? 6 CASES

   How many dollars of inventory does this represent? $113.70

3. The stock room has 12 cans of Lucky Leaf Apple Sauce.

   How many cases are there? 2 CASES

   How many dollars of inventory does this represent? $41.90

4. The stock room has 42 cans of Del Monte corn.

   How many cases are there? 7 CASES

   How many dollars of inventory does this represent? $118.65

5. The stock room has 12 cans of Lucky Leaf Apple Sauce.

   How many cases are there? 2 CASES

   How many dollars of inventory does this represent? $41.90

6. The stock room has 30 cans of Del Monte Carrots.

   How many cases are there? 5 CASES

   How many dollars of inventory does this represent? $109.75

7. The stock room has 24 cans of Heinz B.B.Q. Sauce.

   How many cases are there? 4 CASES

   How many dollars of inventory does this represent? $79.80

8. The stock room has 6 cans of Kikkoman Soy Sauce.

   How many cases are there? 1 CASE

   How many dollars of inventory does this represent? $12.95

9. The stock room has 24 cans of Heinz Tomato Puree.

   How many cases are there? 4 CASES

   How many dollars of inventory does this represent? $63.80

10. The stock room has 108 cans of Good Time orange juice.

How many cases are there? 9 CASES

How many dollars of inventory does this represent? $125.55

11. What is the total April 17 inventory? $945.15

KEY

WORKSHEET 1-B

CHECKING IN NEW STOCK

EXAMPLE: Checking in new stock.

Ordered 5 - Charged for 5 - Received 4

5 charged	$17.95 = 1 case	
4 received	x 1	
1 over charge	$17.95 -	Dollars which would cost the company if no one counted and checked the bills.

DIRECTIONS: Refer to the "Inventory Sheet" to complete this exercise. Shipment of February 13 order.

Figure the cost of each mistake. Then figure the total cost of all mistakes on this shipment for a bill correction.

1. Charged for 2 extra tomato puree. $31.90
2. Charged for 6 extra orange juice. $83.70
3. Charged for 1 extra pickle relish. $14.95
4. Charged for 3 extra peas. $56.85
5. Charged for 1 extra apple sauce. $20.95
6. Charged for 1 extra mustard. $19.95
7. Charged for 2 extra green beans. $37.90
8. Charged for 3 extra carrots. $65.85
9. Charged for 4 extra peas. $75.80
10. Charged for 2 extra B.B.Q. Sauce. $39.90
11. Total cost of all mistakes. $447.75

KEY

WORKSHEET 1-C

COST PER ITEM

EXAMPLE

Some companies want a date and price marked on each item. The invoice will be give the price per case. Figure the price per item by dividing by the number in each case.

$17.95 per case ÷ 6 items per case = $2.99 for each item

DIRECTIONS: Figure the cost per item for the following products.

1. Heinz ketchup $2.99
2. Tomato puree $2.66
3. Orange juice $1.16
4. Pickle relish $2.49
5. Peas $3.16
6. Apple sauce $3.49
7. Sliced apples $3.82
8. Mustard $3.33
9. Soy sauce $2.16
10. Corn $2.83

KEY

WORKSHEET 2

KITCHEN MATH

1. PRACTICE EXERCISE -- Use the Baker's scale and measure the following ingredients.

10 oz. shortening	1 1/2 oz. baking powder
1 lb. 4 oz. sugar	3/4 oz. salt
1 lb. 6 oz. flour	13 oz. shortening
1 lb. semi-sweet chocolate	2 lb. 8 oz. flour
4 oz. sliced almonds	1/2 oz. salt

2. PRACTICE EXERCISE -- Use the Portion scale and measure the following ingredients as practice.

4 oz. dry cereal	20 oz. cheese
6 oz. dry cereal	18 oz. cheese
2 oz. crackers	12 oz. soup (use water for soup)
3 oz. crackers	1 oz. salad dressing
16 oz. cheese	5 oz. mashed potatoes

3. Fill in the missing information.

No. 8 scoop would give 5 oz. or 1/2 c.
No. 24 scoop would give 1/2 oz. or 2 2/3 T.
No. 16 scoop would give 57 g. or 62 mL.
No. 10 scoop would give 113 g. or 100 mL.
No. 20 scoop would give 1 2/3 oz. or 3 1/5 T.
No. 12 scoop would give 85 g. or 83 mL.
No. 30 scoop would give 1 1/4 oz. or 2 1/5 T.

4. PRACTICE EXERCISE:

Measure 1/4 t. salt
Measure 3/4 t. salt
Measure 1/2 t. salt
Measure 1 T. salt
Measure 1 t. salt

5. Draw a line to show where the following measurements are marked on the measuring cups for liquids. Then shade in with a pencil the amount marked beside each cup.

Example:

⅔ Cup →

⅓ Cup

1 Cup

¼ Cup

1 Cup

½ Cup

¾ Cup

KEY

WORKSHEET 3

TIME

EXAMPLE

If the time is 5:30 p.m. when a cake is placed in the oven, and the cake must bake for 35 minutes, at what time will the cake be removed from the oven?

```
 5:30  clock time
+ :35  minutes baking time
 5:65
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Since there are 60 minutes in an hour, the clock time when the cake should be removed is 6:05 p.m.

---

1. Mr. Page told his employees they had a banquet Friday night and the food must be ready by 6:30.

   a. Mary is assigned potatoes which must be in the oven for 70 minutes. Mary figures it will take her 30 minutes to get the potatoes ready for the oven.

      (1) What time should Mary put the potatoes in the oven? 5:20

      (2) What time should Mary start fixing the potatoes? 4:50

   b. Bill is assigned to prepare roasts. He figures it will take them 2 hours and 15 minutes to cook.

      (1) What time should he put them in the oven? 4:15

   C. Ann needs to bake rolls for the banquet. She figures it will take 2 and 1/2 hours from starting to the oven and 35 minutes in the oven.

      (1) What time should Ann put the rolls in the oven? 5:55

      (2) What time should Ann start the rolls? 3:25

2. Mr. Page has planned the following luncheon special--meat balls, grits, almond green beans, combination salad, rolls, and apple pie. Serving time will begin at 11 :30.

   a. Bill studies the recipe and finds the baking time will be 30 minutes. This recipe requires lots of work and Bill is going to allow 2 hours to prepare the meat balls.

      (1) When should he start working on them? 9:00

      (2) When should he put them in the oven? 11:00

   b. The grits must bake for one hour. It will take Mary about 1 hour and 45 minutes to prepare them.

      (1) When should Mary start working on the grits? 8:45

      (2) What time should the grits go into the oven? 10:30

   c. Ann's rolls need to bake for 35 minutes.

      (1) What time should be put them in the oven? 10:55

KEY

SN-83-390/12

WORKSHEET 4

RECIPE MODIFICATIONS

1. Cut the following recipe in half:

10 oz. shortening =	5 oz.	(10 ÷ 2 = 5)
1 lb. 4 oz. sugar =	10 oz.	(20 oz. ÷ 2 = 10 oz.)
1 cups eggs, liquid =	1/2 c.	(1 ÷ 2 = 1/2)
1 T. vanilla =	1½ t.	
1 lb. 4 oz. cake flour =	10 OZ.	
2 T. baking powder =	1 T.	
1 t. salt =	½ t.	
2 1/2 c. milk =	1¼ C.	

2. Double the following recipe:

10 oz. shortening =	1 lb. 4 oz.	(10 oz. x 2 = 20 oz. or 1 lb. 4 oz.)
1 lb. 4 oz. sugar =	2 lb. 8 oz.	(1 lb. 4 oz. x 2 = 2 lb. 8 oz.)
1 cup eggs, liquid =	2 c or 1 pt	
1 T. vanilla =	2 T.	
1 lb 4 oz. cake flour =	2 LB 8 OZ	
2 T. baking powder =	4 T. or ¼ c	
1 t. salt =	2 t.	
2 1/2 c. milk =	5 C.	

3. Double the following recipe:

1 lb. granulated sugar =	2 LB.
8 oz. brown sugar =	1 LB.
8 oz. shortening =	1 LB.
1/4 oz. baking soda =	½ OZ.
1/4 oz. salt =	½ OZ.
1 lb. 8 oz. cake flour =	3 LB.
1/4 oz. ginger =	½ OZ.
1 1/2 oz. molasses =	3 OZ.
8 oz. whole eggs =	1 LB.
3 oz. water =	6 OZ.

4. Double the following recipe:

2 lbs. granulated sugar =	4 LB.
1 lb. 8 oz. shortening =	3 LB.
3/4 oz. salt =	1½ OZ.
1/8 oz. ginger =	¼ OZ.
2 lbs. 12 oz. cake flour =	3 LB. 8 OZ.
1 1/2 oz. baking powder =	3 OZ.
8 oz. whole eggs =	1 LB.
8 oz. skim milk =	1 LB.

5. Divide the following recipe in half:

1 lb. granulated sugar =	8 OZ.
8 oz. brown sugar =	4 OZ.
8 oz. shortening =	4 OZ.
1/4 oz. baking soda =	1/8 OZ.
1/4 oz. salt =	1/8 OZ.
1 lb. 8 oz. cake flour =	12 OZ.
1/4 oz. ginger =	1/8 OZ.
1 1/2 oz. molasses =	3/4 OZ.
8 oz. whole eggs =	4 OZ.
3 oz. water =	1½ OZ.

KEY

PRACTICE EXERCISES: (Show all your work in the space provided.)

1. Judy asked the Food Service Department to prepare punch for her meeting. She has invited 28 people. She wants to have three glasses of punch for each of her guests. Each glass will hold 7 ounces of punch.

   How many glasses of punch need to be made? 84

   How many ounces of punch needs to be made? 588 OUNCES

   There are 32 ounces per quart. To the nearest quart, how much needs to be made? 18

   If each glass is .21 liter, how many liters of punch needs to be made? 17.64 LITER

2. When ordering soda for the punch, one brand is 99¢ for 34 ounces. Another brand is 95¢ for 32 ounces.

   Which is cheaper, the first one or the second one? FIRST

3. When ordering soda for the punch, one brand is 99¢ for a 1-liter bottle. Another brand is 95¢ for a 0.95-liter bottle.

   Which is cheaper, the first one or the second one? FIRST

4. Judy also wants Food Service to bake brownies for her meeting. She wants to allow an average of 4 brownies per guest. The recipe she wants baked makes 8 large brownies.

   How many recipes will need to be baked? 14 RECIPES

5. If three recipes are made at a time, how many times will it need to be made? 5 TIMES

6. Below are the ingredients for one recipe and the amounts needed. How much of each ingredient would be needed to make 3 recipes at a time?

a.	1 egg	3 EGGS
b.	1 1/2 cups milk	4½ CUPS MILK
c.	2 cups sugar	6 CUPS SUGAR
d.	1/4 pound chocolate	3/4 LB. CHOCOLATE
e.	1/4 cup chopped nuts	3/4 CUP NUTS
f.	1/2 teaspoon salt	1½ TSP. SALT
g.	1 tablespoon shortening	3 TBSP. SHORTENING
h.	2/3 cup flour	2 CUPS FLOUR

7. How much of each ingredient would be needed to make 14 recipes at one time?

a. 14 EGGS
b. 21 CUPS MILK = 1 GAL. + 1 QT. + 1 CUP
c. 28 CUPS SUGAR
d. 3½ LB. CHOCOLATE
e. 3½ CUPS NUTS
f. 7 TSP. = 2 TBSP. + 1 TSP. SALT
g. 14 TBSP. = 3/4 CUP + 2 TBSP.
h. 9 1/3 CUPS FLOUR

KEY

WORKSHEET 5-B

AMOUNT OF FOOD FOR SPECIFIED SERVINGS

1. Mr. Smith tells his employees that all hamburger patties must weight one-quarter pound.

   a. How many quarter-pound hamburgers can be made from 15 pounds of hamburger? 60 HAMBURGERS

   b. Fifteen pounds of hamburger costs Mr. Smith $30.75. How much does each quarter-pound hamburger cost? 51¼ CENTS

2. Mr. Smith orders hamburger buns by the "gross." A "gross" equals 144.

   a. If a "gross" of buns costs $38.90, how much does each roll cost? 27¢ PER ROLL

3. Mr. Smith told Bill to always slice 32 slices from a pound of cheese.

   a. If a pound of cheese costs $3.58, how much does each slice cost? 11¢ PER SLICE

4. Bill can make 60 hamburgers an hour. Mr. Smith pays Bill $3.35 per hour.

   a. How much does it cost Mr. Smith for Bill to make one hamburger? .0558, OR ABOUT 6¢

5. Mr. Smith must decide how much to charge for a cheeseburger. To do this, he needs an idea of how much it costs him to make one cheeseburger.

   a. From the information you have, what is Mr. Smith's cost for one cheeseburger? 95¢ TOTAL

   .51 - HAMBURGER
   .27 - BUN
   .11 - CHEESE
   .06 - LABOR

6. Mr. Smith tells his employees that all hamburger patties must weight 120 grams. (1,000 g equals 1 kg)

   a. How many 120 gram hamburgers can be made from 7 kg of ground beef? 58.31 OR 58 HAMBURGERS

   b. Seven kilograms of hamburger costs $28.80. How much does 120 grams grams of ground beef cost? .496, OR ABOUT 50¢

7. Mr. Smith orders hamburger buns by the "gross." A "gross" equsls 144.

   a. If a "gross" of rolls costs $26.40, how much does each roll cost?

   18 CENTS PER ROLL

8. Mr. Smith told Bill to always slice 32 slices from 5 kg of cheese.

   a. If 5 kg of cheese costs $3.58, how much does each slice cost? 11 CENTS PER SLICE

9. Bill can make 50 hamburgers in an hour. Mr. Smith pays Bill $3.45 per hour.

   a. How much does it cost Mr. Smith for Bill to make one hamburger? 6.9¢ OR 7¢

10. Mr. Smith must decide how much to charge for a cheeseburger. To do this, he needs an idea of how much it costs him to make one cheeseburger.

    a. From the information you have, what is the cost of one cheeseburger?

    86¢

    .50 - HAMBURGER
    .18 - BUN
    .11 - CHEESE
    .07 - LABOR

STUDENT EVALUATION A
KEY
Stock Room Math

DIRECTIONS: Refer to the "Inventory Sheet" which you used to complete the worksheets to complete the problems.

1. The inventory showed that you have 48 cans of Lucky Leaf Apple Sauce in storage.

   How many cases does this represent? 8
   How many dollars of inventory does this represent? $167.60

2. The inventory includes 66 cans of Nugget Peas.

   How many cans are in inventory? 11
   What is the value of this inventory? $208.45

3. If you received 2 bottles fewer than you ordered of Heinz ketchup and the restaurant paid for the missing stock, what would be the amount of loss? $5.98

4. What is the per item cost of Kikkomon Soy sauce? $2.16

5. What is the per item cost of Good Time orange juice? $1.16

STUDENT EVALUATION B

Kitchen Math

DIRECTIONS: The instructor should observe the student and complete this performance evaluation. Students are required to perform at 90 percent accuracy or better.

Criteria (90% accuracy)	Excellent	Acceptable	Needs Improvement	Checkpoint Date 1st	2nd	3rd
1. Measure using baker's scale						
2. Measure using the portion scale						
3. Measure ingredients using the scoop						
4. Measure ingredients using measuring spoons						
5. Measure ingredients using measuring cup						

STUDENT EVALUATION C
KEY
Time

DIRECTIONS: Compute the correct time for each word problem.

1. You are assigned to prepare a cake. The cake must bake for 35 minutes and you estimate that is will take 15 minutes to prepare the batter. If you want it to be baked by 4:30 p.m.,

   a. What time should you begin preparing the batter? 3:40 p.m.

   b. What time should you put the cake in the oven? 3:55 p.m.

2. You are assigned to prepare a jello salad. The salad should be refrigerated 4 hours before serving. You know from experience that you will need 20 minutes to prepare the salad. It is to be served at 7 p.m.

   a. What time should you begin preparing the salad? 2:40 p.m.

   b. What time should you have it ready to be refrigerated? 3 p.m.

STUDENT EVALUATION D
KEY
Recipe Modification

1. Divide the following recipe in half.

3 cups sugar	1½
1 cup butter	½
1½ cup cocoa	3/4
1 cup milk	½
4½ cups flour	2 1/4
4 t. soda	2
2 eggs	1
1 t. salt	½
2 t. vanilla	1
2 cups water	1

2. Double the following recipe.

28-ounce can oysters	56 oz.
½ cup butter	1 cup
2 cups cracker crumbs	4 cups
1/8 t. salt	1/4 t.
1/8 t. M.S.G.	1/4 t.
2 eggs	4 eggs
2 cups milk	4 cups

STUDENT EVALUATION E
KEY
Amount of Food for Specified Serving

1. You are working in a delicatessen. Your boss expects 10 pounds of pastrami to serve 40 sandwiches. Ten pounds of pastrami costs $21.50.

   a. What will be the weight of each serving? 4 oz.

   b. How much will each serving cost the owner? 52¢

2. Customers have a choice of onion rolls or whole wheat bread. Onion rolls are purchased by the dozen for $1.92. Whole wheat bread is purchased at 85 cents for a 20-slice loaf.

   a. How much will one onion roll cost the owner? 16¢

   b. How much will two slices of bread cost the owner? 8¢

3. You can prepare pastrami sandwiches in an hour. You are paid $4.05 per hour.

   a. How much does it cost the owner for your time to prepare and serve each sandwich? 7¢

4. Determine from the first three problems the costs involved in preparing a pastrami sandwich, including only the pastrami, onion roll, and labor.

   75¢

KEY
STUDENT EVALUATION
FOR THE MODULE

DIRECTIONS: You will need to refer to the "Inventory Sheet" which you used to complete worksheets and section tests.

1. The inventory shows that you have 39 cans of Del Monte pears in stock.

   a. How many cases does this represent? 6½

   b. How many dollars worth of inventory does this represent? $123.18

2. If you received an order of Heinz pickle relish which was short 2 bottles, what is the value of that shortage? $4.98

3. You are responsible for preparing the following recipe for serving 24 people. The recipe will serve 12 so it needs to be doubled. Preparation time is estimated to be 20 minutes and baking time 45 minutes. The cake should be baked by 3:30 p.m.

Recipe	a. Double the recipe.
1½ cups sugar	3 cups
½ cup margarine	1 cup
3/4 cup cocoa	1½ cups
½ cup milk	1 cup
2 1/4 cups flour	4½ cups
2 t. soda	4 t.
1 egg	2 eggs
½ t. salt	1 t.
1 t. vanilla	2 t.
1 1/4 cup water	2½ cups

   b. What time should you begin preparing the cake? 2:25 p.m.

   c. What time should you put it in the oven? 2:45 p.m.

4. Assume that 20 pounds of cheese will be used to prepare sandwiches. Also assume that 20 pounds of cheese costs $36.00.

   a. What is the weight to the nearest ounce of each serving? 2 oz.

   b. How much will each serving cost? 22¢

5. Assume that you can prepare 40 hamburgers in an hour and that you are paid $3.45 per hour.

   a. How much does it cost the owner for your time to prepare each hamburger? 9¢

SN-83-390 APPLICATION OF BASIC MATH TO FOOD SERVICE I - Script

1. This is a presentation of The Media Center, State Fair Community College, Sedalia, Missouri.

2. This is module SN-83-390, Application of Basic Math to Food Service.

3. Upon completion of this module, you should be able to:
   1. Keep accurate records of food and supplies stock.

4. 2. Measure weight, temperature, and time as related to food service.

5. 3. Calculate the quantity of food to prepare for a specific number of servings.

6. One of the most important jobs an employee of a food service can have is keeping records of food and supplies on hand.

7. Inventory records of all food and supplies on hand should be carefully maintained. To record accurate information, an inventory sheet or stock card is used.

8. The stock card form should provide space for the name of the items in stock;

9. a space for the date when inventory is taken;

10. a space for an inventory identifier such as six cases of 128 ounce cans;

11. a space for recording the number of items, usually cases or pounds, in inventory;

12. a space for recording the price, usually stated as the price per case or pounds;

13. and a space to record the number of items that have been ordered. Orders are usually placed by case or pounds.

14. Since food and supplies are usually ordered by the case or pound, an example of an order entry may appear as six, slash number ten (6/#10). These numbers refer to one case containing six cans of a standard size can. The standard size can in this example is number ten (#10).

15. If, for example, you need at least eighteen number ten cans of the same food or supplies, how many cases would be ordered? Remember, in this example there are six number ten cans in one case.

16. Since there are six cans in a case and you need eighteen cans, divide eighteen by six to find the number of cases which should be ordered.

17. The answer is three cases. Check the answer by multiplying three times six.

18. When an order arrives, the items should be removed from the case and stored on shelves. If, for example, three cases of ketchup had been ordered, remove the cans or jars of ketchup from the case and stack them neatly on the shelf. This stock now becomes part of the inventory.

19. An up-to-date inventory record includes the items placed on the shelf upon receipt of a shipment and any of the same items remaining in stock on the shelf.

20. In the previous example, three cases of ketchup were ordered. Three cases of number ten cans is a total of eighteen cans. To expand this example, consider that at the time the shipment of the three cases arrived, there were still six cans, or one case of ketchup in inventory on the shelf. As the eighteen cans were unpacked and placed on the shelf, the total inventory increased to twenty-four cans since eighteen plus six is twenty-four.

21. Inventory represents an investment of money to the owner of a food service business. This amount of money is part of the businesses financial worth. Therefore, it is no surprise that the owner of a business would want to know the inventory so that the items in inventory can be translated into dollars in inventory.

22. Again, consider the previous example. A case of ketchup costs seventeen dollars and ninety-five cents ($17.95). There are twenty-four cans in inventory after the receipt of shipment. Since there are six cans in one case, divide twenty-four by six to find the total number of cases in inventory. Stop the tape and complete the calculations.

23. Twenty-four divided by six is four. Since there are four cases and the cost per case is seventeen dollars and ninety-five cents ($17.95), multiply seventeen dollars and ninety-five cents ($17.95) times four to find the total inventory of ketchup in a dollar amount.

24. The total dollar amount of ketchup inventory is seventy-one dollars and eighty cents ($71.80).

25. Some food service companies prefer that the person in charge of inventory record both a date of inventory and a price per item. If a case of ketchup costs seventeen dollars and ninety-five cents ($17.95), and there are six cans per case, divide seventeen dollars and ninety-five cents ($17.95) by six to find the cost of a single can. Stop the tape and complete the calculations.

26. In this example, the cost of a single can of ketchup is two dollars and ninety-nine cents ($2.99).

27. A very important aspect of inventory control is the receipt of the goods which have been ordered. Careful checks should be made of the amounts ordered and the amounts received. Checks should also be made to assure that the invoice or bill charges are correct and that the items are in good condition upon receipt.

28. In this example, five cases of ketchup have been ordered and two weeks later a shipment of four cases is received. If the order is not checked to the goods received, the company not only loses the profit that could have been realized by the use or resale of the goods, but also the cost of the goods paid for by the owner. If a case of ketchup costs seventeen dollars and ninety-five cents ($17.95) and the incoming stock is not counted, the owner will lose that amount of money.

29. Meat, fresh vegetables and fresh fruits are usually purchased by weight. Fresh meats such as fish and chicken are usually packed in ice when they are delivered. To accurately check the weight of the items being received, remove the items from the ice and weigh them on a heavy duty scale.

30. Weight is a type of measurement which describes quantity or mass. How much something weighs depends on the consistency of the material and the gravitational field in which weight is being measured. Weight is one of the most frequently used forms of measurement in food service business.

31. Weight may be calculated in the metric system of measurement or the conventional system of measurement. The metric system expresses weight in grams or kilograms and the conventional system uses ounces and pounds.

32. Weight is usually measured on scales. In the food service business, there are three basic types of scales:
    1. The heavy duty scale is used to check the weight of foods as they are received in shipment.
    2. The bakers scale is used for weighing ingredients before mixing.
    3. And the portion scale is used to accurately weigh servings in grams or ounces.

33. Volume is the measurement of an amount of space. Volume indicates how much an object will hold. In the metric system, volume is measured by liters and in the conventional system, volume is measured by teaspoons, cups, pints, quarts, gallons, and so on. Measuring spoons are used for small amounts and serving scoops are used to measure volume in equal portions.

34. It is often necessary to prepare more than a single recipe of the same food; or it may be necessary to prepare only a portion of a recipe. Many businesses have charts which show the basic conversion of volume measurements in the food preparation area. Cookbooks also have tables that include the conversion of the metric and conventional systems.

35. Temperature is a unit of measurement which refers to the degree of hotness or coldness measured on a definite scale such as Fahrenheit or Celsius.

36. There are a variety of thermometers used in food services.
    1. The probe type is used to measure the internal temperature of an ingredient.
    2. The floating type is used to measure the temperature of water in a pot or in pan sinks.
    3. The dial type measures air temperature. This type of thermometer is used in ovens, refrigerators, freezers, pie cases, sandwich bars, beverage dispensers, and salad bars.
    4. The confectionary thermometer is used to measure the temperature in deep fat fryers or in frosting or candy-making.

37. A thermostat is a device for regulating temperature. Thermostats automatically measure and maintain temperature at a designated level. Food service equipment such as ovens, refrigerators, freezers, and fryers are manufactured with thermostats.

38. The preparation of food usually requires the measurement of time. Time is the period in which an action takes place or the point at which something occurs. For food preparation purposes, time can be measured with mechanical devices such as the timer on the oven, a portable table top timer, or the clock on the wall.

39. Baking a cake is an example of food preparation which requires the calculation of time. In this example, the cake must bake for thirty-five minutes. If the time is 2:20 p.m. when the cake is placed into the oven and it must bake for thirty-five minutes, at what time will the cake be removed from the oven? Stop the tape and calculate the time.

40. Since the cake must bake for thirty-five minutes and the time is 2:20 p.m., add thirty-five to twenty to calculate the time at which the cake should be removed from the oven. Twenty plus thirty-five is fifty-five. The cake must be removed from the oven at 2:55 p.m.

41. Recipes often state the pan size to use when preparing food. If the size is not identified on the pan, use a meter stick or yard stick to measure the inside of the pan.

42. The description on the recipe card often states the number of pieces of servings per recipe. If the recipe is a cake or similar food, a meter stick or yard stick can be used to mark the pieces so that when cut, all will be the same size. Restaurant customers prefer the same size servings and will compare their serving to those around them.

43. Recipes are often large, requiring several specific pan sizes to make a specified amount of servings. In this example, the cake recipe requires two pans, each nine inches wide by thirteen inches long by two inches deep (9"x13"x2") or twenty-five centimeters wide by thirty-two centimeters long by five centimeters deep (25x32x5 cm). The description states that the recipe should yield thirty servings.

44. Determine the size of each piece by first calculating how many pieces are in one pan. If there are thirty servings in two pans, divide thirty by two to find the number of servings in one pan.

45. To cut fifteen equal servings from the pan, find the multiples of the length, thirteen inches, and the width, nine inches.

46. The multiples of nine are the two numbers that when multiplied together equal or are closest to nine. Stop the tape and determine the multiples of nine.

47. When three is multiplied times itself, the result is nine. Three times three is nine, so three equal parts can be cut across the width of the cake.

48. In this example, the length of the cake, thirteen inches, cannot be evenly divided by a whole number so each equal part will be expressed as a mixed expression. A mixed expression is a number which includes a fractional value.

49. Remember, each cake serves fifteen people. Also remember that the cake will be divided into three equal parts across the width. Because fifteen servings must be cut from the cake, five parts must be cut from the length of the cake since three times five is fifteen.

50. To divide the length, thirteen inches, into five equal parts, divide thirteen by five. Stop the tape and divide thirteen by five to determine the distance of each cut across the length of the cake.

51. When thirteen is divided by five, the result is two and three-fifths. Three-fifths is a fraction closest to one-half. By approximation, the length of the cake can be cut into five equal parts measuring approximately two and one-half inches. Each serving will measure approximately two and one-half inches by three inches.

52. If one cake serves fifteen people and two cakes serve thirty people, how many cakes will be needed to serve one hundred fifty people? Stop the tape and calculate the number of cakes needed to serve one hundred fifty people.

53. To find the answer, divide one hundred fifty by fifteen. Remember, one cake has fifteen servings. When divided, the answer is ten. Ten cakes would be required to serve one hundred fifty people.

54. If one hundred fifty people are to be served, how many recipes should be baked? Remember, one recipe requires two baking pans. Stop the tape and determine how many recipes should be baked to serve one hundred fifty people.

55. The answer is five recipes. One recipe serves thirty. To determine how many recipes are needed to serve one hundred fifty, divide one hundred fifty by thirty. The answer is five. Five recipes will serve one hundred fifty people.

56. Sometimes food service workers must prepare food for a specific number of people and other times workers must estimate the number of people to be served based on past patronage and the popularity of a certain food with the patrons of the establishment.

57. The application of math is used to calculate how much meat is to be removed from the freezer to thaw in the cooler or how much meat to remove from the cooler and cook. Math is used to determine how many vegetables to prepare or the number of pies and cakes to bake. Left over food is not usable and it eats up the profit of the business. Thawing too much meat can mean spoilage. There should be a daily inventory of the meat cooler contents before meat is removed from the freezer.

58. This is an example which describes the math applications for preparing food for a large number of people. The school food service workers are preparing lunch for seven hundred seventy-five students. One of the items on the lunch menu is corn.

59. One can of corn weighs eight pounds. Each student will receive a four ounce serving. To calculate how many cans must be removed from inventory and prepared for serving, begin by first determining how many ounces are in one eight pound can. Stop the tape and make the calculation.

60. To calculate the number of ounces in an eight pound can, multiply the number of ounces in one pound times eight. Since there are sixteen ounces in one pound, multiply sixteen times eight. The result is one hundred twenty-eight. There are one hundred twenty-eight ounces in an eight pound can of corn.

61. Since each student is to receive a four ounce serving, calculate the number of four ounce servings in an eight pound can of corn. Stop the tape and make the calculation.

62. To determine the number of four ounce servings in an eight pound can of corn, refer to the previous calculation in which the ounces per eight pound can were determined. Since there are one hundred twenty-eight ounces per eight pound can and four ounces are to be served to each student, divide one hundred twenty-eight by four. When one hundred twenty-eight is divided by four, the result is thirty-two. Thirty-two students receive a four ounce serving of corn from one eight pound can.

63. If an eight pound can serves thirty-two students, how many cans of corn are required to serve seven hundred seventy-five students. If the answer is a fractional part of a can, the answer cannot be rounded down to the nearest can. Partial contents must be used, or the remainder discarded. Stop the tape and make the calculation.

64. To deterine the total number of cans to remove from the stock room and prepare for serving to seven hundred seventy-five students, refer to your previous calculations. If each eight pound can will serve thirty-two students, divide the total number to be served by thirty-two. The result is twenty-four and a fractional part. Since there is a fractional part, the entire contents of the twenty-fifth can must be used or the remainder discarded after the can is opened. Twenty-five eight pound cans of corn will be required to serve seven hundred seventy-five students.

65. In this example, a hospital uses sixty oranges each morning for serving breakfast trays. Perishable produce such as oranges are usually ordered on a weekly basis. If each case has one hundred fifty oranges, how many cases should be ordered for the week?

66. To determine the number of oranges needed for one week, begin by multiplying the number of oranges used per day times the number of days in the week. Since sixty oranges are used each day and there are seven days in a week, multiply sixty times seven. The result is four hundred twenty. Now stop the tape and calculate the number of cases to order.

67. To determine the number of cases to order, refer to the total number of oranges needed during a weeks time. Since four hundred twenty oranges are needed per week, and there are one hundred fifty oranges per case, divide four hundred twenty by one hundred fifty. The result is two and a fractional part. Since oranges must be ordered as full cases, three cases must be ordered to make sixty servings per day for a week.

68. This is a summary of the material covered in this module.

69. The food service employee uses mathematics in many different ways. In this module, math was required when calculating the amount of food and supplies to order to maintain a specific inventory;

70. when making measurements of weight, volume, temperature, and time;

71. and when calculating amounts of food to prepare. Math is also required for many other applications in the food services business.

72. This is the end of slide/tape SN-83-390. If you have questions about the material, review the presentation or see your instructor.

73. (Credits)

74. (Disclaimer)

STUDENT GUIDE

PROGRAM: Food Service **UNIT TITLE:** Basic Mathematics

MODULE TITLE: Application of Basic Math to Food Service I **MODULE NO.** SN-83-390

PERFORMANCE OBJECTIVES:

After completing this module, you will be able to complete five basic applications of basic mathematics in Food Service with 90 percent accuracy.

THE MEDIA CENTER State Fair Community College
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Specializing in the development of Mediated Instructional Materials

INTRODUCTION

A presentation for students reviewing the essential steps in basic mathematics as they are used in Food Service.

OBJECTIVES

Upon completion of this module, you will be able to perform five applications of basic mathematics to Food Service.

RESOURCE MATERIALS

The resource materials for this module consist of a slide/tape presentation of the essential steps in mathematics as used in Food Service, a set of worksheets to further illustrate the computation steps involved in basic arithmatic, practice examples and exercises to directly involve the student in this review process, and a set of tests which parallel forms for diagnosis and evaluation of student progress.

PROCEDURES

1. Read the objectives and introduction.

2. Look at one example of each math application in your "Student Guide."

3. If you feel you can pass a test over each application with 90 percent or better accuracy, ask your instructor for the module pretest.

4. If you do not take the pretest, or do not pass it, read all of the procedures listed on this page. Then follow the instructions given.

5. Observe and listen to slide/tape presentation SN-83-390, "Application of Basic Math to Food Service."

6. Complete the worksheets in this booklet as you progress through the slide/tape presentation. Be sure to get help from your instructor when you need it.

7. After you complete each worksheet, ask your instructor to test you over that application before progressing further.

8. When you have completed all your worksheets and the slide/tape presentation, ask your instructor for the module posttest.

9. When you pass the posttest with 90 percent accuracy, you have completed this module.

INFORMATION SHEET 1

STOCK ROOM MATH

Some one must be responsible for counting the food and supplies on hand at designated times--usually once per week.

The month and date of the inventory are placed in the top square. The squares with the diagonal line are used for inventory. The left side shows the number in the stock room on that date. The right side will show how many have been ordered that week.

This inventory represents dollars to the owner and it must be closely controlled.

Orders are made by cases, 6/#10 tells you there are 6 cans in the case and the #10 tells you the size of each can.

INVENTORY SHEET

	1/2	1/9	1/16	1/23	1/30	2/6	2/13	2/20	2/27	3/6	3/13	3/20	3/27	4/3	4/10	4/17	4/24	4/31
Heinz Ketchup 6/#10	2 / 2	3 / 1	1 / 3	2 / 2	4 / 0	2 / 2	3 / 1	1 / 3		$17.95 per case								
Heinz Tomato Puree 6/#10	3 / 1	1 / 3	2 / 2	3 / 1	1 / 3	4 / 0	1 / 3	2 / 2		$15.95 per case								
Good Time Orange Juice 12/24 oz.	10 / 10	15 / 5	17 / 3	5 / 15	3 / 17	11 / 9	9 / 11	8 / 12		$13.95 per case								
Heinz Pickle Relish 6/#10	2 / 3	3 / 2	1 / 4	3 / 2	1 / 4	2 / 3	4 / 1	3 / 2		$14.95 per case								
Nugget Peas 6/#10	3 / 3	2 / 3	4 / 2	2 / 4	4 / 2	1 / 5	5 / 1	4 / 2		$18.95 per case								
Lucky Leaf Apple Sauce 6/#10	1 / 1	2 / 0	1 / 1	0 / 2	1 / 1	1 / 1	2 / 0	1 / 1		$20.95 per case								
Lucky Leaf Sliced Apples 6/#10	2 / 1	1 / 2	3 / 0	1 / 3	2 / 1	3 / 0	1 / 2	3 / 9		$22.95 per case								
French's Mustard 6/128 oz.	2 / 1	1 / 1	0 / 2	1 / 1	2 / 0	1 / 1	0 / 2	1 / 1		$19.95 per case								
French's Wooxy Sauce 6/128 oz.	1 / 1	2 / 0	1 / 1	0 / 2	1 / 1	1 / 1	0 / 2	2 / 0		$14.95 per case								
Kikkoman Soy Sauce 6/128 oz	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1		$12.95 per case								
Del Monte Green Bean 6/#10	4 / 3	2 / 5	6 / 1	5 / 2	6 / 1	5 / 2	4 / 3	6 / 1		$18.95 per case								
Del Monte Corn 6/#10	7 / 1	5 / 3	5 / 3	6 / 2	4 / 4	7 / 1	6 / 2	7 / 1		$16.95 per case								
Del Monte Carrots 6/#10	5 / 1	4 / 2	3 / 3	4 / 2	5 / 1	4 / 2	3 / 3	5 / 1		$21.95 per case								
Del Monte Pears 6/#10	3 / 1	4 / 0	2 / 2	4 / 0	3 / 1	2 / 2	2 / 2	3 / 1		$18.95 per case								
Heinz B.B.Q Sauce 6/128 oz	1 / 4	2 / 3	0 / 5	3 / 2	4 / 1	5 / 0	1 / 4	4 / 1		$19.95 per case								
Martha White Flour 2/50	2 / 1	1 / 2	0 / 3	1 / 2	2 / 1	1 / 2	1 / 2	1 / 2		$19.95 per case								

WORKSHEET 1-A

STOCK ROOM MATH

EXAMPLE

Figure the number of cases on hand after counting the number of can in the stock room.

On January 9, there were 18 cans of ketchup on hand; each case contains 6 cans.

18 ÷ 6 = 3 cases

If each case cost the company $17.95, how many dollars worth of ketchup does the inventory represent?

$17.95 per case
x 3 cases
$53.85 worth of kethup in the stock room

DIRECTIONS: Refer to the "Inventory Sheet" which is included in this module to complete the calculations. Inventory for April 17.

1. The stock room has 204 cans of Good Time orange juice.

   How many cases are there? _____

   How many dollars of inventory does this represent? _____

2. The stock room has 36 cans of Del Monte Green Beans.

   How many cases are there? _____

   How many dollars of inventory does this represent? _____

3. The stock room has 12 cans of Lucky Leaf Apple Sauce.

   How many cases are there? _____

   How many dollars of inventory does this represent? _____

4. The stock room has 42 cans of Del Monte corn.

   How many cases are there? _____

   How many dollars of inventory does this represent? _____

5. The stock room has 12 cans of Lucky Leaf Apple Sauce.

   How many cases are there? _____

   How many dollars of inventory does this represent? _____

6. The stock room has 30 cans of Del Monte Carrots.

   How many cases are there? _____

   How many dollars of inventory does this represent? _____

7. The stock room has 24 cans of Heinz B.B.Q. Sauce.

   How many cases are there? _____

   How many dollars of inventory does this represent? _____

8. The stock room has 6 cans of Kikkoman Soy Sauce.

   How many cases are there? _____

   How many dollars of inventory does this represent? _____

9. The stock room has 24 cans of Heinz Tomato Puree.

   How many cases are there? _____

   How many dollars of inventory does this represent? _____

10. The stock room has 108 cans of Good Time orange juice.

    How many cases are there? _____

    How many dollars of inventory does this represent? _____

11. What is the total April 17 inventory? _____

WORKSHEET 1-B

CHECKING IN NEW STOCK

EXAMPLE: Checking in new stock.

Ordered 5 - Charged for 5 - Received 4

5 charged	$17.95 =	1 case
4 received	x 1	
1 over charge	$17.95 -	Dollars which would cost the company if no one counted and checked the bills.

DIRECTIONS: Refer to the "Inventory Sheet" to complete this exercise. Shipment of February 13 order.

Figure the cost of each mistake. Then figure the total cost of all mistakes on this shipment for a bill correction.

1. Charged for 2 extra tomato puree. _____
2. Charged for 6 extra orange juice. _____
3. Charged for 1 extra pickle relish. _____
4. Charged for 3 extra peas. _____
5. Charged for 1 extra apple sauce. _____
6. Charged for 1 extra mustard. _____
7. Charged for 2 extra green beans. _____
8. Charged for 3 extra carrots. _____
9. Charged for 4 extra peas. _____
10. Charged for 2 extra B.B.Q. Sauce. _____
11. Total cost of all mistakes. _____

WORKSHEET 1-C

COST PER ITEM

EXAMPLE

Some companies want a date and price marked on each item. The invoice will be give the price per case. Figure the price per item by dividing by the number in each case.

$17.95 per case ÷ 6 items per case = $2.99 for each item

DIRECTIONS: Figure the cost per item for the following products.

1. Heinz ketchup _____
2. Tomato puree _____
3. Orange juice _____
4. Pickle relish _____
5. Peas _____
6. Apple sauce _____
7. Sliced apples _____
8. Mustard _____
9. Soy sauce _____
10. Corn _____

INFORMATION SHEET 2

"KITCHEN MATH"

WEIGHT

Weight is most frequently used as a measurement in food service because it is accurate. Weight may be given in the metric system or the customary ones.

Volume means the amount of space taken by a quantity of material. It is measured by liters in the metric system and by cups, pints, quarts, and gallons in the customary system. Measuring spoons are used for small amounts and serving scoops are used to measure volume when serving foods so each portion is the same.

Math is used when it is necessary to prepare more than one recipe or to make only part of a recipe.

Reading thermometers and setting thermostats accurately are important in food service.

Many food processes require you to measure time. It is also necessary to determine the time to start cooking foods so everything is ready at serving time.

The meter or yard stick is used to determine correct pan sizes and to mark portions so each guest will receive the same size.

Math is used to determine how much food to order and prepare based on every day traffic and special events.

Baker's scale: This is the best type of scale or measuring device to use for it will insure accuracy. The baker's scale is a twin platform scale. On the platform to the left is placed a metal scoop, in which the food to be weighed is placed. On the platform to the right is placed a special weight equal to the weight of the scoop. A beam that is graduated in 1/4 ounces runs horizontal across the front of the scale. The beam has a weight attached to it. This weight is placed on the number of ounces one wishes to weigh. The

beam is graduated in 1/4 ounces up to 1 pound. If a larger amount is to be weighed, additional metal weights of 1, 2, and 4 pounds are provided. When using the baker's scale, always balance the scale before setting the weights for a given amount.

To weigh 8 ounces of egg whites, for example, one would place a container large enough to hold the egg whites on the left platform of the twin platform baker's scale and balance the scale. Move the weight on the beam 8 additional ounces. Add the egg whites until the scale balances again. If one wishes to weigh, let's say, 10 1/4 ounces of flour, place the metal scoop on one platform and the special balancing weight on the other platform. This will bring the two platforms to a complete balance. The weight on the scaling beam is placed on 10 1/4 ounces. Flour is placed in the metal scoop until the two platforms balance a second time. For weighing 1/4 ounce of salt, however, a piece of paper could be placed on the left platform and the platforms balanced. Set the balance weight at 1/4 ounce, and add salt until the platforms balance again. The baker's scale can be used to weigh up to 8 or 10 pounds.

The student cook will be expected to measure most of his ingredients on this scale. The ingredients of most commercial recipes are given in weights for accuracy. It is easier for the beginning student cook to use liquid measure rather than weight. All other ingredients are normally given in weight. The best recipes are those which use weights.

Portion scale: Used for measuring food servings. Has a single square, seamless steel platform on which the food to be weighed is placed. A large dial on front of the scale is graduated from 1/4 ounce to 32 ounces. The rotating dial needle determines the weight of the item placed on the platform. This type of scale is used when exact serving portions are required.

Scoops: Are metal half-ball cups with movable strips on the inside of the cup. This strip scrapes out the food. It is operated by a clip on the

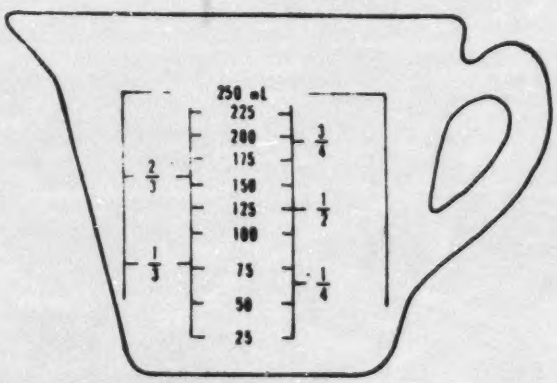
side of the handle. Scoops are used to fill muffin cups or drop cookie dough on baking sheets. They also measure serving portions. Scoops are numbered to indicate size. The larger the number, the smaller the amount.

Scoop Sizes, Weights, and Measures

Scoop Number	Weight		Measure	
	Metric	Customary	Metric	Customary
8	142 g	5 oz	125 mL	½ c
10	113 g	4 oz	100 mL	⅜ c
12	85 g	3 oz	83 mL	⅓ c
16	57 g	2 oz	62 mL	¼ c
20	47 g	1⅔ oz	48 mL	3⅓ T
24	43 g	1½ oz	40 mL	2⅔ T
30	35 g	1¼ oz	33 mL	2⅕ T

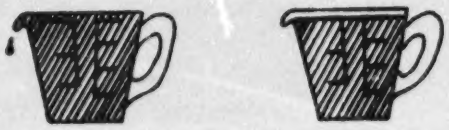
Measures: Metal cups, round, with a slight lip for easy pouring. They have a side handle and are accurately graduated in quarters. They are available in gallons, half gallons, quarts, and pints. They are used to measure liquids and some dry ingredients.

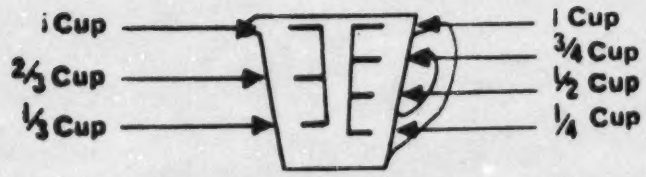
Measuring spoons are used to measure amounts of such dry ingredients as salt, spices, and baking powder. Metric measuring spoons are graduated in sizes of 1 mL, 2 mL, 5 mL, 15 mL, and 25 mL. Customary measuring spoon sizes are one-fourth teaspoon, one-half teaspoon, one teaspoon, and one tablespoon.



A 250-mL measuring cup.

If a recipe calls for one cup of liquid, never pour the liquid to the very top of the measuring cup.





Usually the thirds (1/3, 2/3, 1 cup) are marked on the left.

Usually the fourths (1/4, 1/2, 3/4, and 1 cup) are marked on the right.

WORKSHEET 2

KITCHEN MATH

1. PRACTICE EXERCISE -- Use the Baker's scale and measure the following ingredients.

10 oz. shortening	1 1/2 oz. baking powder
1 lb. 4 oz. sugar	3/4 oz. salt
1 lb. 6 oz. flour	13 oz. shortening
1 lb. semi-sweet chocolate	2 lb. 8 oz. flour
4 oz. sliced almonds	1/2 oz. salt

2. PRACTICE EXERCISE -- Use the Portion scale and measure the following ingredients as practice.

4 oz. dry cereal	20 oz. cheese
6 oz. dry cereal	18 oz. cheese
2 oz. crackers	12 oz. soup (use water for soup)
3 oz. crackers	1 oz. salad dressing
16 oz. cheese	5 oz. mashed potatoes

3. Fill in the missing information.

No. 8 scoop would give _____ oz. or _____ c.
No. 24 scoop would give _____ oz. or _____ T.
No. 16 scoop would give _____ g. or _____ mL.
No. 10 scoop would give _____ g. or _____ mL.
No. 20 scoop would give _____ oz. or _____ T,
No. 12 scoop would give _____ g. or _____ mL.
No. 30 scoop would give _____ oz. or _____ T.

4. PRACTICE EXERCISE:

Measure 1/4 t. salt
Measure 3/4 t. salt
Measure 1/2 t. salt
Measure 1 T. salt
Measure 1 t. salt

5. Draw a line to show where the following measurements are marked on the measuring cups for liquids. Then shade in with a pencil the amount marked beside each cup.

Example:

$\frac{2}{3}$ Cup →

$\frac{1}{3}$ Cup

1 Cup

$\frac{1}{4}$ Cup

1 Cup

$\frac{1}{2}$ Cup

$\frac{3}{4}$ Cup

INFORMATION SHEET 3

KITCHEN MATH

TEMPERATURE

Measuring Temperature: Thermometers measure temperature. This is a very important function. For instance, the amount of heat in the oven governs the baking of bread or the roasting of meat.

In deep fat frying, different temperatures are used for different foods. If the fat is too hot, the food will brown before it is cooked through. If it is too cool, the food will become soggy with fat before it browns.

In making frostings and candy, the correct temperature is critical. Too high a temperature will cause the sugar syrup to harden before the frosting or candy can be made. If the temperature is not high enough, the frosting or candy will not harden at all.

Refrigerators must be kept within a certain temperature range for proper storage of food. If the refrigerator is too warm, bacteria and molds will grow and the food may spoil. If it is too cold, the food may dry out and become icy.

As you study the different kinds of food preparation, you will use temperature control constantly.

Ovens, refrigerators, freezers, and fryers are equipped with thermostats. A thermostat is a device for regulating the temperature. Thermostats automatically measure temperature and maintain it at a certain level.

Thermometers are of two types. The dial type is used for recording the temperature of air. The probe type is used to measure the internal temperature of an ingredient. Some ovens have built-in probes for use in roasting meats.

WORKSHEET 3

TIME

EXAMPLE

If the time is 5:30 p.m. when a cake is placed in the oven, and the cake must bake for 35 minutes, at what time will the cake be removed from the oven?

$$\begin{array}{rl} 5:30 & \text{clock time} \\ +\ :35 & \text{minutes baking time} \\ \hline 5:65 & \end{array}$$

Since there are 60 minutes in an hour, the clock time when the cake should be removed is 6:05 p.m.

---

1. Mr. Page told his employees they had a banquet Friday night and the food must be ready by 6:30.

   a. Mary is assigned potatoes which must be in the oven for 70 minutes. Mary figures it will take her 30 minutes to get the potatoes ready for the oven.

      (1) What time should Mary put the potatoes in the oven? _____

      (2) What time should Mary start fixing the potatoes? _____

   b. Bill is assigned to prepare roasts. He figures it will take them 2 hours and 15 minutes to cook.

      (1) What time should he put them in the oven? _____

   C. Ann needs to bake rolls for the banquet. She figures it will take 2 and 1/2 hours from starting to the oven and 35 minutes in the oven.

      (1) What time should Ann put the rolls in the oven? _____

      (2) What time should Ann start the rolls? _____

2. Mr. Page has planned the following luncheon special--meat balls, grits, almond green beans, combination salad, rolls, and apple pie. Serving time will begin at 11 :30.

   a. Bill studies the recipe and finds the baking time will be 30 minutes. This recipe requires lots of work and Bill is going to allow 2 hours to prepare the meat balls.

      (1) When should he start working on them? _____

      (2) When should he put them in the oven? _____

   b. The grits must bake for one hour. It will take Mary about 1 hour and 45 minutes to prepare them.

      (1) When should Mary start working on the grits? _____

      (2) What time should the grits go into the oven? _____

   c. Ann's rolls need to bake for 35 minutes.

      (1) What time should be put them in the oven? _____

INFORMATION SHEET 4

CONVERSION CHART

3 t. = 1 T.

1/4 t. + 1/4 t. = 1/2 t.

1/4 t. + 1/2 t. = 3/4 t.

1/2 t. + 1/2 t. = 1 t.

16 T = 1 cup

8 T = 1/2 cup

4 T = 1/4 cup

5 1/3 T = 1/3 cup

10 2/3 T = 2/3 cup

16 oz. = 1 pound

1 cup = 1/2 pint

2 cups = 1 pint

2 pints = 1 quart

4 quarts = 1 gallon

1000 grams = 1 kilogram

WORKSHEET 4

RECIPE MODIFICATIONS

1. Cut the following recipe in half:

10 oz. shortening = 5 oz. (10 ÷ 2 = 5)

1 lb. 4 oz. sugar = 10 oz. (20 oz. ÷ 2 = 10 oz.)

1 cups eggs, liquid = 1/2 c. (1 ÷ 2 = 1/2)

1 T. vanilla = _____

1 lb. 4 oz. cake flour = _____

2 T. baking powder = _____

1 t. salt = _____

2 1/2 c. milk = _____

2. Double the following recipe:

10 oz. shortening = 1 lb. 4 oz. (10 oz. x 2 = 20 oz. or 1 lb. 4 oz.)

1 lb. 4 oz. sugar = 2 lb. 8 oz. (1 lb. 4 oz. x 2 = 2 lb. 8 oz.)

1 cup eggs, liquid = _____ c or _____ pt

1 T. vanilla = _____

1 lb 4 oz. cake flour = _____

2 T. baking powder = _____ T. or _____ c

1 t. salt = _____

2 1/2 c. milk = _____

3. Double the following recipe:

1 lb. granulated sugar = _____

8 oz. brown sugar = _____

8 oz. shortening = _____

1/4 oz. baking soda = _____

1/4 oz. salt = _____

1 lb. 8 oz. cake flour = _____

1/4 oz. ginger = _____

1 1/2 oz. molasses = _____

8 oz. whole eggs = _____

3 oz. water = _____

4. Double the following recipe:

2 lbs. granulated sugar = _____

1 lb. 8 oz. shortening = _____

3/4 oz. salt = _____

1/8 oz. ginger = _____

2 lbs. 12 oz. cake flour = _____

1 1/2 oz. baking powder = _____

8 oz. whole eggs = _____

8 oz. skim milk = _____

5. Divide the following recipe in half:

1 lb. granulated sugar = _____

8 oz. brown sugar = _____

8 oz. shortening = _____

1/4 oz. baking soda = _____

1/4 oz. salt = _____

1 lb. 8 oz. cake flour = _____

1/4 oz. ginger = _____

1 1/2 oz. molasses = _____

8 oz. whole eggs = _____

3 oz. water = _____

WORKSHEET 5-A

AMOUNT OF FOOD FOR SPECIFIED SERVINGS

EXAMPLE 1:

The school cooks are preparing lunch for 775 students. How many cans of corn should the vegetable cook prepare when each can weighs 8 lbs. and each student will receive a 4 oz. serving.

1. Figure how many ounces in each can.

   16 ounces = 1 pound

   16 ounces x 8 pounds = 128 ounces per can

2. How many 4 ounce servings in each can?

   128 ounces per can ÷ 4 ounces per serving = 32 - 4 oz. servings per can

3. If each can serves 32 and the vegetable is to be prepared for 775, how many cans must be obtained from the stock room?

   775 student ÷ 32 servings per can = 25 cans

EXAMPLE 2:

A hospital needs 60 oranges each morning for breakfast trays. You need to order a supply for one week. How many should you order if each case has 150?

1. Find the number you need for one week. Multiply the number you need for one day x the number of days in 1 week.

   60 x 7 = 420 needed

2. Divide the number needed by the number in each case to obtain the number of cases to order.

   420 ÷ 150 = 2.80 or 3 cases

PRACTICE EXERCISES: (Show all your work in the space provided.)

1. Judy asked the Food Service Department to prepare punch for her meeting. She has invited 28 people. She wants to have three glasses of punch for each of her guests. Each glass will hold 7 ounces of punch.

   How many glasses of punch need to be made? _____

   How many ounces of punch needs to be made? _____

   There are 32 ounces per quart. To the nearest quart, how much needs to be made? _____

   If each glass is .21 liter, how many liters of punch needs to be made?

   _____

2. When ordering soda for the punch, one brand is 99¢ for 34 ounces. Another brand is 95¢ for 32 ounces.

   Which is cheaper, the first one or the second one? _____

3. When ordering soda for the punch, one brand is 99¢ for a 1-liter bottle. Another brand is 95¢ for a 0.95-liter bottle.

   Which is cheaper, the first one or the second one? _____

4. Judy also wants Food Service to bake brownies for her meeting. She wants to allow an average of 4 brownies per guest. The recipe she wants baked makes 8 large brownies.

   How many recipes will need to be baked? _____

5. If three recipes are made at a time, how many times will it need to be made? _____

6. Below are the ingredients for one recipe and the amounts needed. How much of each ingredient would be needed to make 3 recipes at a time?

   a. 1 egg _____
   b. 1 1/2 cups milk _____
   c. 2 cups sugar _____
   d. 1/4 pound chocolate _____
   e. 1/4 cup chopped nuts _____
   f. 1/2 teaspoon salt _____
   g. 1 tablespoon shortening _____
   h. 2/3 cup flour _____

7. How much of each ingredient would be needed to make 14 recipes at one time?

   a. _____
   b. _____
   c. _____
   d. _____
   e. _____
   f. _____
   g. _____
   h. _____

WORKSHEET 5-B

AMOUNT OF FOOD FOR SPECIFIED SERVINGS

1. Mr. Smith tells his employees that all hamburger patties must weight one-quarter pound.

   a. How many quarter-pound hamburgers can be made from 15 pounds of hamburger? _____

   b. Fifteen pounds of hamburger costs Mr. Smith $30.75. How much does each quarter-pound hamburger cost? _____

2. Mr. Smith orders hamburger buns by the "gross." A "gross" equals 144.

   a. If a "gross" of buns costs $38.90, how much does each roll cost?

   _____

3. Mr. Smith told Bill to always slice 32 slices from a pound of cheese.

   a. If a pound of cheese costs $3.58, how much does each slice cost? _____

4. Bill can make 60 hamburgers an hour. Mr. Smith pays Bill $3.35 per hour.

   a. How much does it cost Mr. Smith for Bill to make one hamburger? _____

5. Mr. Smith must decide how much to charge for a cheeseburger. To do this, he needs an idea of how much it costs him to make one cheeseburger.

   a. From the information you have, what is Mr. Smith's cost for one cheeseburger? _____

6. Mr. Smith tells his employees that all hamburger patties must weight 120 grams. (1,000 g equals 1 kg)

   a. How many 120 gram hamburgers can be made from 7 kg of ground beef?

   _____

   b. Seven kilograms of hamburger costs $28.80. How much does 120 grams grams of ground beef cost? _____

7. Mr. Smith orders hamburger buns by the "gross." A "gross" equsls 144.

   a. If a "gross" of rolls costs $26.40, how much does each roll cost?

   _____

8. Mr. Smith told Bill to always slice 32 slices from 5 kg of cheese.

   a. If 5 kg of cheese costs $3.58, how much does each slice cost? _____

9. Bill can make 50 hamburgers in an hour. Mr. Smith pays Bill $3.45 per hour.

   a. How much does it cost Mr. Smith for Bill to make one hamburger? _____

10. Mr. Smith must decide how much to charge for a cheeseburger. To do this, he needs an idea of how much it costs him to make one cheeseburger.

    a. From the information you have, what is the cost of one cheeseburger?

    _____

STUDENT EVALUATION A

Stock Room Math

DIRECTIONS: Refer to the "Inventory Sheet" which you used to complete the worksheets to complete the problems.

1. The inventory showed that you have 48 cans of Lucky Leaf Apple Sauce in storage.

   How many cases does this represent? _____
   How many dollars of inventory does this represent? _____

2. The inventory includes 66 cans of Nugget Peas.

   How many cans are in inventory? _____
   What is the value of this inventory? _____

3. If you received 2 bottles fewer than you ordered of Heinz ketchup and the restaurant paid for the missing stock, what would be the amount of loss? _____

4. What is the per item cost of Kikkomon Soy sauce? _____

5. What is the per item cost of Good Time orange juice? _____

STUDENT EVALUATION 5

Kitchen Math

DIRECTIONS: The instructor should observe the student and complete this performance evaluation. Students are required to perform at 90 percent accuracy or better.

Criteria (90% accuracy)	Excellent	Acceptable	Needs Improvement	Checkpoint Date 1st	2nd	3rd
1. Measure using baker's scale						
2. Measure using the portion scale						
3. Measure ingredients using the scoop						
4. Measure ingredients using measuring spoons						
5. Measure ingredients using measuring cup						

STUDENT EVALUATION C

Time

DIRECTIONS: Compute the correct time for each word problem.

1. You are assigned to prepare a cake. The cake must bake for 35 minutes and you estimate that is will take 15 minutes to prepare the batter. If you want it to be baked by 4:30 p.m.,

   a. What time should you begin preparing the batter? _____

   b. What time should you put the cake in the oven?_____

2. You are assigned to prepare a jello salad. The salad should be refrigerated 4 hours before serving. You know from experience that you will need 20 minutes to prepare the salad. It is to be served at 7 p.m.

   a. What time should you begin preparing the salad?_____

   b. What time should you have it ready to be refrigerated?_____

STUDENT EVALUATION D

Recipe Modification

1. Divide the following recipe in half.

3 cups sugar	_____
1 cup butter	_____
1½ cup cocoa	_____
1 cup milk	_____
4½ cups flour	_____
4 t. soda	_____
2 eggs	_____
1 t. salt	_____
2 t. vanilla	_____
2 cups water	_____

2. Double the following recipe.

28-ounce can oysters	_____
½ cup butter	_____
2 cups cracker crumbs	_____
1/8 t. salt	_____
1/8 t. M.S.G.	_____
2 eggs	_____
2 cups milk	_____

STUDENT EVALUATION E

Amount of Food for Specified Serving

1. You are working in a delicatessen. Your boss expects 10 pounds of pastrami to serve 40 sandwiches. Ten pounds of pastrami costs $21.50.

   a. What will be the weight of each serving?_____

   b. How much will each serving cost the owner? _____

2. Customers have a choice of onion rolls or whole wheat bread. Onion rolls are purchased by the dozen for $1.92. Whole wheat bread is purchased at 85 cents for a 20-slice loaf.

   a. How much will one onion roll cost the owner?_____

   b. How much will two slices of bread cost the owner?_____

3. You can prepare pastrami sandwiches in an hour. You are paid $4.05 per hour.

   a. How much does it cost the owner for your time to prepare and serve each sandwich? _____

4. Determine from the first three problems the costs involved in preparing a pastrami sandwich, including only the pastrami, onion roll, and labor.

   _____

STUDENT EVALUATION
FOR THE MODULE

DIRECTIONS: You will need to refer to the "Inventory Sheet" which you used to complete worksheets and section tests.

1. The inventory shows that you have 39 cans of Del Monte pears in stock.

   a. How many cases does this represent? _____

   b. How many dollars worth of inventory does this represent? _____

2. If you received an order of Heinz pickle relish which was short 2 bottles, what is the value of that shortage? _____

3. You are responsible for preparing the following recipe for serving 24 people. The recipe will serve 12 so it needs to be doubled. Preparation time is estimated to be 20 minutes and baking time 45 minutes. The cake should be baked by 3:30 p.m.

Recipe	a. Double the recipe.
1½ cups sugar	_____
½ cup margarine	_____
3/4 cup cocoa	_____
½ cup milk	_____
2 1/4 cups flour	_____
2 t. soda	_____
1 egg	_____
½ t. salt	_____
1 t. vanilla	_____
1 1/4 cup water	_____

   b. What time should you begin preparing the cake? _____

   c. What time should you put it in the oven? _____

4. Assume that 20 pounds of cheese will be used to prepare sandwiches. Also assume that 20 pounds of cheese costs $36.00.

   a. What is the weight to the nearest ounce of each serving? _____

   b. How much will each serving cost? _____

5. Assume that you can prepare 40 hamburgers in an hour and that you are paid $3.45 per hour.

   a. How much does it cost the owner for your time to prepare each hamburger?_____